REMARKS

Claims 13 and 15-27 remain in this application, and are currently under final rejection. The Examiner has indicated that Applicants' arguments set forth in the response filed on December 26, 2001 have been considered but are deemed insufficient to overcome the rejection. Applicants respectfully traverse, continue to assert that their prior arguments do suffice to overcome the grounds previously expressed by the Examiner for this rejection, and present the following additional arguments.

35 U.S.C. §103(a) rejection (Jalics et al.):

Claims 13 and 15-25 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,708,053 to Jalics et al. The Examiner states that Jalics et al. is a proper reference, despite the fact that Jalics et al. nowhere disclose that the composition disclosed therein has improved hysteresis loss and reinforcement properties—an objective of the present invention—on the grounds that Applicants' present claims do not contain a requirement as to hysteresis loss or reinforcement properties, and that a person of ordinary skill would find it obvious to infer from Jalics et al. that Jalics' composition would intrinsically possess the hysteresis loss and reinforcement properties achieved by the compositions within the scope of the present invention. Applicants respectfully traverse.

The proper inquiry under 35 U.S.C. §103(a) is not whether the present claims contain a limitation as to hysteresis or reinforcement properties, but instead whether a person of ordinary skill would have found it obvious to apply the teachings of Jalics et al. in order to arrive at the present invention. Because the stated purpose of Jalics et al.—to provide an efficient method of processing a specific type of silica-filled rubber composition (see col. 1, lines 25-30)—is entirely unrelated to the

object of Applicants' present invention, a person of ordinary skill, seeking to improve hysteresis and reinforcement properties for use in a tire tread, would not find it at all obvious to consult Jalics et al.

Further, Jalics et al. merely state generally that in one embodiment, a combination of a primary accelerator and a secondary accelerator may be used, and recite nine suitable types of accelerators that may be employed, one of which is the generic term "amines." Accordingly, it would not be obvious to a person of ordinary skill in the art to infer from Jalics et al. that the combination of a primary accelerator made of a free aliphatic or cycloaliphatic amine and a secondary accelerator made of guanidine would result in a composition possessing improved hysteresis and reinforcement properties as in the present invention, because Jalics et al. provide no insight whatsoever to identify aliphatic or cycloaliphatic amines as being distinctly preferable to all other known amine compounds.

Moreover, Applicants disagree that one of ordinary skill would naturally infer that the Jalics et al. composition intrinsically possesses desirable hysteresis loss and reinforcement properties. Jalics et al. disclose the use of thirty-six different combinations of accelerators (col. 9, lines 4-7 and 11-14), of which the combination of guanidine and "amines" is merely one. At least thirty-five of the thirty-six combinations disclosed by Jalics et al. would fail to produce the improved hysteresis and reinforcement properties produced by compositions within the scope of Applicants' invention. Moreover, if one of ordinary skill read the term "amine" in Jalics et al. to disclose any amine other than a free aliphatic or cycloaliphatic amine—for example, an aromatic amine—that combination, too, would fail to achieve the improved hysteresis and reinforcement properties. Accordingly, an inference that the compositions disclosed in Jalics et al. intrinsically possess favorable hysteresis and reinforcement properties would not only be unnatural for one of ordinary skill, it would also be incorrect.

Applicants also disagree with the Examiner's assertion that the comparative data provided by Applicants in Example 4 of the present Specification is inadequate to establish an unexpected or surprising improvement over Jalics et al., on the ground that the data in Example 4 does not compare a "composition within the scope of the present claims, i.e. comprising amine and guanidine, with a composition outside the scope of the present claims but within the scope of Jalics et al., i.e. composition comprising sulfenamide and guanidine." Applicants emphasize that *each* of the Examples 1-5 in the present Specification provide data comparing compositions within the scope of the present claims with compositions "within the scope of Jalics et al., i.e. composition comprising sulfenamide and guanidine," and that *each* example sufficiently illustrates that compositions within the present invention demonstrate an unexpected and surprising improvement over Jalics type compositions.

Example 1 compares a composition 4 within the scope of the present claims with a control composition 1 of Jalics type. Composition 1 comprises 2 phr of sulfenamide (CBS) and 1.5 phr of diphenylguanidine (DPG), *see* Spec., page 15, lines 12-13 (stating that Formula F1 includes CBS and DPG), while composition 4 comprises the exact components as composition 1 but with an additional 0.8 phr of amine (DDCHMI). *See* Spec., page 18, lines 1-2 (stating that composition 4 comprises F1 plus DDCHMI). Table 1 shows that composition 4 of the present invention exhibits a reduced tgδ value of 0.266 and a G" value of 0.690, compared to Jalics type composition 1, which exhibits the much greater tgδ value of 0.355 and a G" value of 1.230.

Example 2 also compares compositions of the present invention (6, 8 and 10) with compositions of Jalics type (5, 7 and 9). Compositions 5, 7 and 9 each comprise 2 phr of sulfenamide (CBS) and 1.5 phr of diphenylguanidine (DPG), *see* Spec., page 23, line 9 (stating that composition 5 comprises the aforementioned F1) and page 23, lines 11 and 13 (stating that compositions 7 and 9

comprise F1). Compositions 6, 8 and 10 of the present invention each comprise CBS and DPG, but with an additional 0.8 phr of amine (DDCHMI). *See* Spec., page 23, lines 10, 12 and 14. Table 2 shows that compositions 6, 8 and 10 always exhibit reduced tgδ values of 0.281, 0.228 and 0.305, respectively, and reduced G" values of 0.890, 0.488, and 0.843, respectively, compared to Jalics type compositions 5, 7 and 9, which exhibit much greater tgδ values of 0.370, 0.249, and 0.336, respectively, and much greater G" values of 1.430, 0.576, and 1.060, respectively.

Example 3 compares composition 13 of the present invention with a composition 11 of Jalics type. Composition 11 comprises 2 phr of sulfenamide (CBS) and 1.1 phr of diphenylguanidine (DPG), *see* Spec., page 26, line 19 and page 27, line 1 (stating the inclusion of CBS and DPG in the composition of Formula F2), while composition 13 comprises the exact components as composition 11 but with an additional 0.8 phr of amine (DDCHMI). *See* Spec., page 28, lines 5-6. Table 3 shows that composition 13 of the present invention exhibits a reduced tgδ value of 0.148 and G" value of 0.252, compared to Jalics type composition 11, which exhibits the much greater tgδ value of 0.281 and G" value of 0.878.

Example 4 compares composition 19 of the present invention with a composition 16 of Jalics type. Composition 16 comprises 2 phr of sulfenamide (CBS) and 1.5 phr of diphenylguanidine (DPG), *see* Spec., page 32, line 8 (stating that composition 16 comprises Formula F1), while composition 19 of the present invention comprises the exact components as composition 16 but with an additional 1.2 phr of amine (DDCHMI). *See* Spec., page 32, line 14. Table 5 shows that composition 19 of the present invention exhibits a reduced tgδ value of 0.254 and G" value of 0.605, compared to Jalics type composition 16, which exhibits the much greater tgδ value of 0.355 and G" value of 1.230.

Example 5 compares compositions of the present invention (21, 22 and 23) with a composition 20 of Jalics type. Composition 20 comprises 2 phr of sulfenamide (CBS) and 1.5 phr of diphenylguanidine (DPG), *see* Spec., page 35, line 7 (stating that composition 20 comprises Formula F1), while compositions 21, 22 and 23 of the present invention each comprise the exact components as composition 20 but with an additional amount of amine, either DDCHMI or DCHA. *See* Spec., page 35, lines 8-17. Table 6 shows that compositions 21, 22 and 23 of the present invention respectively exhibit reduced tgδ values of 0.327, 0.322 and 0.266, and respective G" values of 1.070, 1.010 and 0.690, compared to Jalics type composition 20, which exhibits the much greater tgδ value of 0.355 and G" value of 1.230.

Accordingly, the present specification provides substantial data comparing compositions within the scope of the present claims with compositions outside the scope of the present claims but within the scope of Jalics et al. In each of the five comparisons mentioned above, compositions within the present invention demonstrated unexpected and surprising reductions in hysteresis (expressed by tgδ and G") compared to the much greater hysteresis exhibited by Jalics type compounds.

Thus, the improvement of adding a free aliphatic or cycloaliphatic amine to the composition of the present invention is not obvious in view of the disclosure of Jalics et al. Therefore, Applicants respectfully submit that Claims 13 and 15-25 are patentable over Jalics et al.

35 U.S.C. §103(a) rejection (Hojo in view of Jalics et al.):

Claims 13, 15-22, and 24-27 have been rejected under 35 U.S.C. § 103(a) as unpatentable over U.S. Patent No. 5,939,493 to Hojo in view of Jalics et al. Despite the fact that Hojo nowhere suggests that the composition disclosed therein has improved hysteresis loss and reinforcement properties, the Examiner alleges that Hojo is nonetheless a proper reference, on the grounds that

Applicants' present claims do not contain a requirement as to hysteresis loss or reinforcement properties, and that a person of ordinary skill in the art would find it obvious to infer from Hojo that Hojo's composition would intrinsically possess the hysteresis loss and reinforcement properties achieved by the compositions within the scope of the present invention. Applicants respectfully traverse.

The proper inquiry under 35 U.S.C. §103(a) is not whether the present claims contain a limitation as to hysteresis or reinforcement properties, but rather whether an artisan of ordinary skill would have found it obvious to apply the teachings of Hojo in order to arrive at the present invention. For the reasons set forth more fully in subsequent paragraphs, Applicants submit that a person of ordinary skill in the art would not have found it obvious to consider Hojo in combination with Jalics et al. while pursuing the present invention. As to the Examiner's second contention, that an ordinary artisan would naturally have inferred that compositions disclosed by Hojo combined with Jalics et al. intrinsically possess improved hysteresis and reinforcing properties, Applicants have already shown that at least thirty five of the thirty six possible combinations disclosed by Jalics et al. fail to possess these properties, rendering the inference suggested by the Examiner nonobvious and also erroneous.

The Examiner emphasizes that Hojo discloses the use of amine in addition to the metal dithiophosphate. Applicants respectfully contend that Hojo places so little emphasis on any benefit of adding an amine as an accelerator that a person of ordinary skill in the art would have found it far from obvious to infer from Hojo that an aliphatic or cycloaliphatic amine could improve hysteresis or reinforcing properties. The first sixteen examples disclosed by Hojo do not even contain amine at all. (See col. 12, line 22 to col. 13, line 19.) Furthermore, the compositions of Hojo comprise other vulcanization accelerators (see col. 2, line 61 to col. 3, line 53), such as benzothiazole derivatives, thiuram compounds, amino groups, 2-benzothiazylsulfenamides, and 2-benzothiazylsulfenimides.

Though the amine compound is cited amongst the other possible accelerators, Hojo emphasizes in column 2, lines 24-30, the use of antimony dithiophosphates. Hojo is thus primarily concerned with the finding of a very specific accelerator and, when not teaching away from the present invention by stating that carbon black may be perfectly used without need of any amine compound, merely includes tertiary amines among a long list of other possible accelerators. Accordingly, despite Hojo's disclosure that amines can be added to the metal dithiophosphate, it would not have been obvious to one of ordinary skill to discern from Hojo that aliphatic or cycloaliphatic amines could lead to reduced hysteresis.

Moreover, one of ordinary skill in the art would not have found it obvious to combine Hojo with Jalics et al. Though Hojo discloses the use of silica (used by Jalics et al.) as a preferred filler, Jalics et al. are concerned with the problem of processing a silica-filled *non-vulcanized* rubber composition, while Hojo's purpose is to solve the problem of heat aging of a *vulcanized tire.* Furthermore, even if one were to combine Hojo with Jalics et al., one would not arrive at Applicants' present invention. Upon combining the references, one would not know which accelerator to select from the comprehensive list supplied by Jalics et al., nor would one know whether or not to use an amine compound at all, given the omission of an amine compound from Hojo's first sixteen examples. And even if one decided to use an amine compound, one would not know whether to choose an aromatic or a non-aromatic amine, in order to reduce hysteresis of the vulcanized composition at low deformation. Accordingly, Applicants respectfully submit that it would not have been obvious to one of ordinary skill in the art to apply Hojo in view of Jalics et al., and arrive at the present invention.

The Examiner states that the data in Example 4 of the present specification is insufficient to show unexpected or surprising results over Hojo in view of Jalics et al., alleging that the data does not show proper side by side comparison between a composition of the present invention and a composition

outside the present invention, because compositions 17 and 19 use different amounts of amine. Appellants respectfully submit that the right element for an objective comparison is not the *amount* of amine in phr between compositions 17 and 19, but the identity between the molar amount of amine (7.1 mmol) between control composition 16, which uses an aromatic amine (DPG) as the sole amine, and the equivalent control composition 17 which has an aliphatic amine (DDCHMI) as the sole amine. Example 4 shows that when the 1.5 phr of aromatic amine DPG in control composition 16 are replaced by the same molar content in mmoles of aliphatic amine DDCHMI in order to obtain control composition 17 (which comprises only an aliphatic amine in addition to sulfenamide), this control composition 17 also exhibits a much higher tgδ value of 0.308 than composition 19 of the present invention (0.254).

Compositions 18 and 19 are characterized by a nearly identical total molar amount of amine—7.1 + 4.5 for composition 19, and 11.8 for composition 18. *See* Table 5. The comparison of compositions 18 and 19 shows that a greater amount (2.5 phr instead of 1.5 phr) of aromatic amine (DPG) as the sole amine in composition 18 fails to reduce hysteresis at low deformation as successfully as composition 19 of the invention; composition 18 has a tgδ value of 0.306 and a G" of 0.872, compared to composition 19's tgδ value of 0.254 and G" value of 0.605. *See id.* The synergistic effect of the presently claimed invention is particularly evident in Example 4, wherein both the amine and the guanidine must be present in the composition to obtain the improved hysteresis and improved reinforcement properties. Thus, the use of an amine or guanidine alone (as might be inferred from Hojo and/or Jalics et al.) is insufficient to achieve the results of the present invention including improved hysteretic and reinforcement properties. Having demonstrated that a person of ordinary skill in the art would not have found it obvious to combine Hojo with Jalics et al. in such a way as to arrive at the

present invention, Applicants respectfully submit that Claims 13, 15-22, and 24-27 of the present application are patentable over Hojo in view of Jalics et al.

35 U.S.C. §103(a) rejection (Nakfutami or Halasa, in view of Hojo or Araki):

Claims 13, 15-22, and 24-25 have also been rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,804,644 to Nakafutami et al. or U.S. Patent No. 5,534,592 to Halasa et al., either of which in view of either Hojo or U.S. Patent No. 5,939,484 to Araki et al.

Nakafutami et al. in view of Hojo:

A person of ordinary skill seeking to improve the reinforcement properties of a tire tread rubber composition—an object of the present invention—would not find it obvious to combine Nakafutami et al with Hojo so as to arrive at the present invention. First, Nakafutami et al. disclose a rubber composition which specifically requires hydrogenation of the elastomer in order to improve certain properties and processability for the *non-vulcanized composition*. Hojo does not mention any hydrogenation of the elastomer, as his invention pertains to a *vulcanized* tire. Second, the composition of Nakafutami et al. works effectively whatever the vulcanizing accelerator may be, and all the usual accelerators are deemed acceptable. In contrast, the findings of Hojo are based on a very specific accelerator, a metal dithiophosphate. Thus, it would not have been obvious to one of ordinary skill in the art to combine these references, because they have contradictory teachings.

Even if one of ordinary skill did combine Hojo with Nakafutami et al., one would not arrive at the present invention. One would not know which accelerator to select from the comprehensive list supplied by Nakafutami et al., nor whether or not to use an amine compound at all, given the

omission of an amine compound from Hojo's first sixteen examples. And even if one did decide to use an amine compound, one would not know whether to choose an aromatic or a non-aromatic amine.

The Examiner alleges that Example 4 of the present Specification fails to establish unexpected and surprising results over Nakafutami et al. in view of Hojo, on the grounds that composition 18—which the Examiner correctly notes is outside the scope of the present invention—demonstrates better hysteresis loss than composition 16, which the Examiner describes as a composition of the present invention. Applicants respectfully traverse. Composition 16 is clearly *not* a composition of the present invention. *See* Spec., page 33, lines 1-2 (stating that composition 16 is a control composition, and that composition 19 is the *only* one of compositions 16-19 which is in conformity with the present invention). Contrary to the Examiner's suggestion, Example 4 demonstrates that composition of the present invention 19 demonstrates superior hysteresis properties than any of compositions 16-18, which are *all* outside the scope of the present invention. Applicants emphasize the importance of the synergistic effect of the presently claimed invention, shown in Examples 1-5 of the Specification and particularly in Example 4 (pages 32-35), wherein both the amine and the guanidine must be present in the composition in order to obtain the improved properties described by the present disclosure. The use of an amine or a guanidine alone (as may be contemplated by Hojo and Nakafutami et al.) fails to achieve improved hysteresis and improved reinforcement properties. Thus, Applicants submit that Claims 13, 15-22, and 24-25 are patentable over Nakafutami et al. in view of Hojo.

Halasa et al. in view of Hojo:

A person of ordinary skill would not have thought it obvious to combine Halasa et al. with Hojo. First, the composition of Halasa et al. specifically contains no vinyl aromatic monomer, in

contrast to the composition of Hojo, which involves a composition which *may comprise* styrene monomers (such as SBR as seen in the Examples and in Claim 6). Second, the composition of Halasa et al. works efficiently no matter what vulcanization accelerator is used, whereas the findings of Hojo are based on a very specific accelerator. Thus, it would not be obvious to one of ordinary skill in the art to combine these two references, in that they have contradictory teachings.

Even if one of ordinary skill did combine Hojo with Halasa et al., one would not arrive at the presently claimed invention. One would not know which accelerator to select from among all known ones, nor whether or not to use an amine compound at all, given the omission of an amine compound from Hojo's first sixteen examples. And even if one were to decide to use an amine compound, one would not know whether to choose an aromatic or a non-aromatic amine.

The Examiner alleges that Example 4 of the present Specification fails to establish unexpected and surprising results over Halasa et al. in view of Hojo, based once more on the belief that composition 16 is a composition of the present invention. Applicants have already shown that composition 16 is clearly *not* a composition of the present invention, and that Example 4 shows that composition of the present invention 19 demonstrates superior hysteresis properties than any of compositions 16-18, which are *all* outside the scope of the present invention. Applicants emphasize the importance of the synergistic effect of the claimed invention, which is evident in Examples 1-5 of the present Specification, and particularly in Example 4. Thus, Applicants respectfully submit that Claims 13, 15-22, and 24-25 are patentable over Halasa et al. in view of Hojo.

Nakafutami et al. or Halasa et al. in view of Araki:

One of ordinary skill would not find it obvious to combine Araki et al. with either Nakafutami et al. or Halasa et al. First, Nakafutami et al. and Halasa et al. both disclose compositions for use with a *vulcanized* tire, whereas the invention of Araki et al. pertains to mixing of *non-vulcanized* compositions. Second, the compositions of Halasa et al. may comprise a specific diene rubber (either a hydrogenated diene rubber or a blend of polybutadienes excluding SBR), while Araki et al. discloses a composition comprising *any* diene rubber (which may even comprise styrene monomers). Applicants therefore respectfully submit that it would not be obvious to one of ordinary skill in the art to combine these references, as they have contradictory teachings.

Furthermore, even if one did combine these references, one would not arrive at the presently claimed invention, because Araki provides no incentive to select a silica dispersion improver comprising a non-aromatic amine to reduce hysteresis of the vulcanized composition at low deformation. One of ordinary skill in the art would not know which of the five types of dispersion improvers recited by Araki (col. 6, lines 24-32) to choose. If one did for some reason discard the other four dispersion improvers listed by Araki and decide to use an amine composition, one still would not know to select a non-aromatic amine, because Araki discloses no advantage to using non-aromatic amines over aromatic amines. Col. 4, lines 9-17.

The Examiner next alleges that Example 4 of the present Specification fails to establish unexpected and surprising results over Nakafutami et al. or Halasa et al. in view of Araki et al, again on the belief that composition 16 is a composition of the present invention. Applicants have already shown that composition 16 is clearly *not* a composition of the present invention, and that Example 4 shows that composition of the present invention 19 demonstrates superior hysteresis properties than any of compositions 16-18, which are all outside the scope of the present invention. Applicants emphasize the

importance of the synergistic effect of the claimed invention, which is evident in Examples 1-5 of the present Specification, and particularly in Example 4. Accordingly, Applicants respectfully submit that Claims 13, 15-22, and 24-25 are patentable over either Nakafutami et al. or Halasa et al. in view of Araki et al.

35 U.S.C. §103(a) rejection (Bomal et al. in view of either Hojo or Araki et al.):

Lastly, Claims 13, 15-21, and 26-27 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,140,393 to Bomal et al. in view of either Hojo or Araki et al.

Bomal et al. in view of Hojo:

A person of ordinary skill in the art would not have found it obvious to combine Bomal et al. with Hojo. First, Hojo discloses a composition applicable to a *vulcanized* tire, whereas Bomal et al. are concerned with *non-vulcanized* rubber compositions. Second, Bomal's invention works effectively with any vulcanization accelerator, whereas Hojo requires the use of a very specific accelerator. Thus, it would not be obvious to one having ordinary skill in the art to combine these two references because they have contradictory teachings.

Further, even if one did combine Bomal et al. with Hojo, one still would not arrive at the instant claim 1. Upon combining the references, one still would not know which accelerator to select from Bomal et al., nor would one know whether or not to use an amine compound at all, given the omission of an amine compound from Hojo's first sixteen examples. And even if one were to decide to use an amine compound, one would not know whether to choose an aromatic or a non-aromatic amine, in order to reduce hysteresis of the vulcanized composition at low deformation.

The Examiner next alleges that Example 4 of the present Specification fails to establish unexpected and surprising results over Bomal et al. in view of Hojo, again on the belief that composition 16 is a composition of the present invention. Applicants have already shown that composition 16 is clearly *not* a composition of the present invention, and that composition of the present invention 19 demonstrates superior hysteresis properties than any of compositions 16-18, which are all outside the scope of the present invention. Applicants emphasize the importance of the synergistic effect of the claimed invention, which is evident in Examples 1-5 of the present Specification, and particularly in Example 4. Thus, Applicants respectfully submit that Claims 13, 15-21, and 26-27 are patentable over Bomal et al. in view of Hojo.

Bomal et al. in view of Araki et al.:

Even if one of ordinary skill in the art were to read Bomal et al. in view of Araki et al., one still would not arrive at the present invention. One would not know which vulcanization accelerator to select from the many well known ones usable in accordance with Bomal et al.. Further, one would not know which of the five possible types of silica-dispersion improvers cited in Araki et al. to choose. Amine compounds are merely cited in Araki et al. as one of 5 possible types of silica-dispersion improver, and Araki et al. does not express a preference for non-aromatic amine compounds as opposed to aromatic amines. There is no suggestion in the art to combine the disclosures of Araki et al. and Bomal et al. and select an amine compound to arrive at the non-obvious combination of a guanidine and an aliphatic or cycloaliphatic amine as in Applicants' present invention.

The Examiner next alleges that Example 4 of the present Specification fails to establish unexpected and surprising results over Bomal et al. in view of Araki et al., again on the belief that

composition 16 is a composition of the present invention. Applicants have already shown that composition 16 is clearly *not* a composition of the present invention, and that composition of the present invention 19 demonstrates superior hysteresis properties than any of compositions 16-18, which are all outside the scope of the present invention. Applicants emphasize the importance of the synergistic effect of the claimed invention, which is evident from the Examples 1-5 of the present Specification. Thus Applicants respectfully submit that Claims 13, 15-21, and 26-27 are patentable over Bomal et al. in view of Araki et al.

In view of the foregoing remarks, Applicants believe that Claims 13 and 15-27 of the present application are in condition for allowance. Applicants respectfully request that a timely Notice of Allowance be issued in this case.

Respectfully submitted,

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